Elastic Properties of CaSiO3 Perovskite at High P and High T *	X17B1

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We have explored the possibility of measuring the elastic properties of CaSiO3 perovskite at high P and T using simultaneous X-ray diffraction, X-ray radiography, and ultrasonic measurements in a DIA-type cubic anvil apparatus (SAM85) installed at the superwiggler beamline X17B1 at NSLS in Brookhaven National Laboratory. The starting material was polycrystalline sample with $CaSiO_3$ composition hot-pressed at 1 GPa and 1000 ^oC. Ultrasonic measurements were carried out by mounting a dual mode Lithium Niobate transducer (10 degree Y-cut, 30 MHz for S wave and 50 MHz for P wave) at the back of the WC anvil. The sample was inserted into a cubic boron epoxy cell assembly with NaCl and BN as surrounding materials. Alumina rods were inserted from both sides of the boron epoxy cube, which one of them is used as buffer rod. The X-ray spectra of the NaCl were analyzed to monitor the cell parameters while the sample spectra were checked for $CaSiO_3$ perovskite phase transformation. X-ray radiography set-up was used to monitor the sample length change by monitoring the gold foils inserted between the sample and alumina rods. The first experiment was unable to reach the stability field of $CaSiO_3$ perovskite due to an unexpected mechanical failure of the WC anvil at 11.6 GPa before heating. No elasticity data at high pressure and high temperature for $CaSiO_3$ perovskite was collected. The sharp images of the gold foils at both ends of the sample showed the possibility of measuring the sample length and therefore the elastic property of unquenchable phases.

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